# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

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## Original Correspondence.

### RATING OF MINES AND COLLIERIES.

—Your correspondent, "J. G. Williams," in his letter on this tant subject, has, I think, based his "sentiments" on two erro- stand-points—

That the colliery proprietors of South Wales propose an appeal Quarter Sessions, considering the 6d. per ton is not an equilisa- mong them all.

Taking into consideration the words in the Act of Elizabeth, he rates shall be equal, and that the rent shall be the basis of ates; therefore, the *bona fide* rent is to be found only by refer- o the lease or agreement entered into between the landlord enant.

ould first point out that the colliery proprietors of South Wales king no initiative in this matter, and that the intended notices peal proceed from the County Assessment Committee, who say whilst in some of the Unions the collieries are assessed upon present "net annual value," in others they are only assessed at oyalty-rent payable to the landlord, and in others at a uniform ment of 6d. per ton upon the quantity of coal worked in the -thus producing an unequal county assessment, which they now o remedy by appealing against the assessment of the collieries se Unions not assessed at their present "net annual value."

ondly, it appears to me that your correspondent's "sentiments" *rectly opposed* to the present law of rating.

43 Eliz., c. 2, it is enacted that—

ery occupier of lands, houses, tithes, coal mines, and saleable underwoods parish" shall be rated for the relief of the poor "according to the ability ame parish."

meaning of this is very clearly illustrated in the case of R. *v.* 6 T. R. 155, where it was held—

at the assessment for the relief of the poor ought to be so contrived that habitant should contribute in proportion to his ability, which is to be ined by his *possessions* in the parish. Every inhabitant ought to be rated ing to the *present value of his estate*, whether it continue of the same value n he purchased it, or whether the estate is rendered more valuable by the ements which he has made upon it."

in the case of Sir A. Earby, 2 Bulst. 354, it was held—

t by the words and meaning of the 43 Eliz., c. 2, the overseers can only he *occupiers* of the land, and not the lessors."

in R. *v.* Lower Mitton, 9 B. C. 810, it was held—

at the rate must be laid according to the *annual profit or value* which the of occupation within the parish produces."

y letter on this subject in the Journal of Oct. 15 I showed that rateable" or "net annual value" contemplated by the Legis- was the reasonable rent a (hypothetical) tenant would be ex- to give, supposing he had to pay all "usual tenants' rates and and tithe commutation rent-charge, if any, in addition to such nd deducting from such rent the probable average annual cost (landlord's) repairs, insurance, and other expenses, if any, ne- y to maintain the hereditaments in a state to command such

The Legislature, however, does not sanction the interpreta- ut upon the word rent by your correspondent. In the case of Dorking, 18 Jur. 673, it was held—

t the rent agreed for and paid may be always taken *as evidence*, more trong, according to the circumstances *of that supposed rent* from which tatute the rateable value is to be arrived at;" but "rent is not the sole n from which the assessment is to be made, nor can the rent be taken as fact exclusive and conclusive by which the rateable value is to be ar- t."

in the case of R. *v.* Overseers of Brinkworth, 10 L. T. R. 608, held—

t the estimate according to which the rate shall be calculated shall be *actual rental paid*, but the rent at which the premises might have been bly expected to let from year to year."

ould also refer your correspondent to my previous letter, and the ts from judgments there quoted in the cases of R. *v.* Attwood, nd C. 277, R. *v.* Lord Granville, 9 B. and C. 189, where the of Queen's Bench decided that the occupier of a colliery is le not only on a reasonable mine-rent or royalty, but, *in addi-* pon a reasonable rent for the improved value of the property son of the tenant's expenditure in engines, railways, and other capital.

r correspondent puts the question, "What is the rent as respects iery more than a house, shop, or farm in the eye of the law? are, or should be, equal;" and argues from this that the *actual* aid to the landlord is the only true criterion of value.

ke it for granted that he seriously believes his deductions are cordance with the intention and meaning of the *law as it now* ; and I think I am justified in doing so, seeing that he refers to t of Elizabeth, and argues from it. But at the same time his iments" exhibit such an utter want of knowledge of the true ples of rating, according to the statute and expounded law, n charity, I can only suppose his purpose is to set forth his eculiar views, with a hope of their being embodied in future ments.

"suggestions" require no consideration, and cannot lead to ussion," so long as he entirely ignores all law and precedent, am completely at a loss to perceive how their adoption would e "litigation" (he does not say with whom, or on what subject). "throwing all the rates on the landlord the colliery proprie- will be *exempt* from rating, whilst their brother parishioners till be paying rates as tenants for their houses, farms, &c., to xemption of the landlord, and yet this is to produce *equality*, greater cordiality between the parishioners.

our correspondent seems completely to forget that as by law the nt or occupier (except, perhaps, in cases of weekly tenancy) has to pay the rates, to the exemption of the landlord, and that con- ently he has to pay his *rent and taxes*. So if the law were al- , making the rates to fall on the landlord, the only result would at the landlord would, of course, charge the tenant with the by an *increased* rent, and that still the burden would fall, gh indirectly, upon the occupier, as before. If the tenant of a e, who can now afford to pay 50*l.* per annum rent, *and* 10*l.* per m for rates, had not to pay the rates, he could naturally afford y his landlord the 10*l.* as increased rent.

e questions raised by your correspondent, "Mining Man," are rovided for under the existing law of rating. The inequality omplains of, where "first-class shops and houses are rated at more than cottages," would be set right at once if the over- of the Union he refers to only did their duty, and justly exer- the powers already vested in them by 25 and 26 Vict., c. 103, sec. 14, which enacts that in making the "valuation lists," "unless such overseers think that the rate for the relief of the poor *correctly shows the full amount* of the ratable value of all such hereditaments they *shall* revise such valuations."

Railway rolling-stock and canal boats are exempt from rating, as "movable plant," or "tenant's chattels," by the decisions of the Court of Queen's Bench; and it must not be forgotten that they only form part of the working plant of the railway and the canal, and are indirectly rated through the profits or receipts received by those properties. Again, the superior Courts have decided that a tenant of a mere right of sporting or fishing is not assessible in respect thereof, but the occupier or owner of the soil or stream who grants the right, and derives a profit therefrom, should be assessed in respect thereof by an increase in the value of the land.

I understood "Reader" only to raise a question of rateability under the existing laws, and, therefore, he could not reasonably include those items touched upon by "Mining Man," whose wishes, like those of "J. G. Williams," would render necessary an entire revision and re-enactment of our Laws on Rating. M.E. AND C.E.

*Swansea, Nov. 7.*

### PEAT FUEL, AND COAL.

SIR,—The question of the commercial development of the peat deposits of both Great Britain and Ireland having once more been raised, it may not be uninteresting to consider to what extent peat fuel can compete with coal as an article of commerce. The subject, as it is truly said, has for many years received occasional notice, and not long since a "peat fever" was prevalent, raged even in some places, and speculation in peat bogs was rife—in fact, the thing was overdone on the speculative side, and not sufficiently done on the practical side. But it is not without its good effects, for, while speculation ceased, and those who knew of and cared for it only as a speculation, cursed and forgot it as a bubble of the day, many men were led to investigate the matter, try the fuel, and give it that measure of consideration which its importance demanded; and this has been going on in various parts of the country quietly, but steadily and persistently.

The use of peat, as a fuel, has been tried in isolated cases at iron works, manufacturing establishments, as well as for domestic use; yet it has never came into general favour, and it is probable that within any reasonable distance of coal-producing districts it never will. Isolated cases will continue to occur where peat fuel, liquid fuel, or even wood, could be advantageously used in preference to coal; but the utmost care must be taken not to conclude from this that the manufacture of peat could be profitably carried on as a separate industry. Where a good deposit of iron, for example, is found in immediate proximity to a deposit of dense peat, the manufacture of iron could often be well carried on, because as a high quality of finished iron—almost equal to charcoal iron—would be obtained, the additional outlay would be of less consideration, as the iron would, perhaps, fetch 50 per cent. more in the market. But if the peat had to be carried any considerable distance to the smelting-works the cost of the iron would be so much increased that, if sold in the market at the highest price, what it would realise there would be a loss upon its manufacture.

Nothing but disappointment and loss can result from any effort to make peat enter into general competition with coal; but if those situated in the immediate vicinity of rich peat bogs were to exert themselves to turn them to account for local purposes they would confer a boon upon their neighbours, and benefit the country generally. A peat-producing district can never be independent of the nearest coal-producing district, if there be any idea of the former becoming a great manufacturing centre, but the peat may be made to do much to diminish the consumption of imported fuel, and thus augment the prosperity of the community generally. The process employed for treating peat must be at once cheap and expeditious, and any process that pretends to manufacture peat to the density of coal should be unhesitately rejected, for we can always buy coal more cheaply than we can make its equivalent. The secret of utilising peat is just to do as much to it as can be done cheaply, aiming at improvement, but not at perfection, because peat, in the most perfect condition that the most sanguine could hope for, would have no such advantage over coal as would cause it to command a higher price in the market, unless for exceptional purposes, than the natural fuel. The process for treating peat which seems likely to succeed best generally is that which depends largely upon nature to remove the enormous quantity of water, which lessens its value. Unless a large proportion of this water be removed the peat remains worthless, and from the very nature of peat the extraction of this water is a matter of considerable difficulty. Perhaps, the cheapest mode of dealing with the peat is merely to canalise the bog, so as to have (say) 12 ft. canals and 12 ft. banks. In throwing up these banks care should be taken to make the mass as loose as practicable, and to remove as many of the large fibres (those over ¼ in. thick) as possible, These large fibres can well be used for burning on the spot, but they spoil any peat which it is attempted to compress. With regard to the press, it appears that all have attempted to make it do too much—that is to say, make the peat dry too rapidly. Slow compression is what is needed, and the press must admit the very rapid escape of water, for a very thin layer of compressed peat is absolutely waterproof. The best form of press would, therefore, be one with a framework box for the plunger to work in; and this box should be of considerable length—10 feet long by 2 feet square, for example. The box should be formed of four gridirons of the size mentioned, the bars being 2 in. by 1 in., and 1 in. apart, the narrow part of the bars being toward the inside and outside of the box. The top and bottom of the gridirons should be so connected with crossheads that the tightening of the screw of the press should tend to hold the bars firm by tension. The peat from the bank should be fed in as regularly as possible, an iron plate being inserted every 2 ft., to prevent the compressed peat coming out in too large blocks. The pressure should then be applied gradually, and a very large proportion of the water will be removed.

When the bog is large enough to pay the expense of a tramway, the whole of the peat can be cheaply got by working on the straight face, or better by working home from two faces. In that case, the compressing machinery should be put at the corner of the bog, and canals should then be made on the two farthest sides of (say) the square. The peat thrown up from one would be drying whilst the other was being made; and that thrown up from the second canal would dry whilst the first was carried, and a further quantity thrown up, and so on, until every foot of peat is removed. In the case of the water being very abundant, one canal can be formed from the extreme corner to the compressing machinery, and the partially dried peat can be floated to its destination on a suitable raft. This mode of working has been satisfactorily used both in Ireland and in Germany, but whenever it has been sought to effect too much with the peat loss has resulted. Peat used as peat is advantageous, but peat used as a substitute for coal can only prove valuable under exceptional circumstances. In good mechanical form a ton of peat will measure 36 bushels, so that it is too bulky for long carriage (a ton of coal measuring but 24 bushels), especially as ton for ton the heat-producing power would be entirely in favour of coal. ERIN.

*Nov. 4.*

### COAL TRANSPORT IN THE COLONIES.

SIR,—In an article that appeared in the *Mining Journal* of May 7 it was stated, as regards Coal in the Colonies, that "the price at which the coal can be raised is as low as is at all necessary to secure a good market; but the price of railway transport from the pits to the shipping ports is said to be excessive." The *Mining Journal*, to enable the colonists to judge of the justice of this complaint, gives the rates charged from certain English mines, and it is said that these rates vary from four-tenths to five-tenths of a penny per ton per mile.

Unfortunately, however, for the purpose of comparison, the distances given in the table commences at 128 miles, the rate for which is 0·51d. per ton per mile. Now, in New South Wales the longest distance we shall have to carry coal to the shipping ports, even if the *Western* Collieries (not yet developed) ever succeed, will be 75 miles, the rate for which is at present 0·90d. per ton per mile, and if this rate be compared with the rates charged on the Great Northern Railway, England, and the Great Eastern Railway, England—the former of which carries 2,500,000 tons per annum, and the latter 1,200,000 tons per annum—it will be found that we are not 5 per cent. in excess of their rates for similar distances. It is presumed, moreover, that on all the coal-carrying lines in England an engine will haul at least 480 tons; but on the Great Western Railway of New South Wales—on which are constructed immense zig-zag lines, for the purpose of surmounting the vast Blue Mountain ranges—an engine of the same tractive power as those used in England can haul 80 tons only. To obtain, then, the same profit which English lines receive we should have to charge six times the English price.

The conclusion that people in England, ignorant of all the circumstances, would arrive at would probably be that the natural difficulties in the way of bringing coal to the shipping ports of New South Wales are so great as to preclude the feasibility of supplying the steam shipping which visits the port at anything like a reasonable cost. This, however, is not the case, except as regards the Great Western Collieries, the owners of which are foolishly desirous of competing with the Great Northern Collieries of New South Wales, to accomplish which they desire their coal to be carried at a dead and ruinous loss to the railway department.

There are no difficulties as regards curves and gradients on the Great Northern Railway of New South Wales, on which an engine can haul the same quantity as can be hauled on English lines. On this line the great coal mines of New South Wales are situated, and if the population of Australia were to become twice as large as that of England, and the demand for coal exceed that of England fourfold, the resources of these mines would not be exhausted for centuries—indeed, the supply is illimitable.

The majority of the northern mines opened are situated on the line of railway, and are distant from the shipping port, Newcastle, 2, 3, 5, 9, and (in one case only) 31 miles. The rates charged for haulage and crainage are as under:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| For any distance under 7 miles ..... | | | | | | 0s. | 10d. |
| Above 7 miles and not exceeding 10 miles ..... | | | | | | 1 | 0 |
| Over 10 | ,, | ,, | 15 | ,, | ..... | 1 | 3 |
| ,, 15 | ,, | ,, | 25 | ,, | ..... | 1 | 10 |
| ,, 25 | ,, | ,, | 35 | ,, | ..... | 2 | 4 |

NOTE.—The above rates include the use of cranes and staiths for shipment at Newcastle.

No complaint has been made as to these charges being excessive; indeed, they are as low as they can well be—lower than the English Great Northern Railway, and the English Great Eastern Railway, both of which charge up to 50 miles 1d. per ton per mile, and 1s. per ton added; our minimum price is 10d. with crainage, theirs is 1s. 6d. without crainage.

With these prices our coal companies are enabled to put their coal on board vessels at the port of Newcastle—every convenience being provided by the railway department—at a cost to the purchaser of 7s. per ton. The same coal can be delivered at Sydney, 60 miles of sea intervening, at 12s. 6d. per ton, with a profit to the companies of from 10 to 12 per cent. The contract price for supplying the Peninsula and Oriental Company's steamships with coal is 13s. per ton at the port of Sydney. Can it be supplied cheaper either at Liverpool or Southampton? The fact of the matter is the *western* collieries of this country cannot be fully developed for another century. For the present the owners must be contented with supplying local wants, and in course of time they must necessarily have the monopoly of the whole of the western districts; but even if the colonies continue to grow as they have grown to this time, the demand for western coal, though continually increasing, will not be equal to the supply for 100 years at least. From this truth, however, there is no escaping—that the Western collieries can never compete with the Northern collieries in supplying coal for export from the colonies.

ONE INTERESTED IN RAILWAYS, BUT ALTOGETHER UNCONNECTED WITH COLLIERIES.

*Sydney, New South Wales, Sept. 2.*

### ON THE MARITIME SHIP CANAL.

SIR,—Having recently given your readers my opinion as to the said ship canal being constructed for the general conveyance of merchandise between the Bristol and English Channels, thereby saving many hours in traversing round the Land's End, I respectfully further beg to state that, if it be decided the said scheme shall commence and proceed at or near Bridgewater, it must adopt the original canal as far as Tiverton, Devon, which I well know is very deep throughout, and admirably calculated, with little improvements, for such increased traffic; and the bridges also might be altered. As to the remaining portions, I am opinion there will be very little, if any, difficulty in

making and carrying out such a grand and important project; and being confident that the scheme will meet with public favour, and be beneficial to Tiverton, I would suggest that it be at once made publicly known, in order that many of the nobility and other various members may join the projectors in forming a committee, when a powerful Bill may be prepared for early presentation to Parliament in the ensuing session.—*London, Nov.* 9. G. B. (A Tivertonian.)

## THE FUTURE OF MINING IN SPAIN—No. I.

SIR,—I have not been able as yet to fulfil the promise made to you before my departure for this country—that of forwarding you some information with reference to mining matters. The first month I employed in visiting the various mining districts of the Province of Teruel, Aragon. Some of these are situated in the high ranges of mountains called Sierra de Albaracin, from the town of the same name, once inhabited by the Moors. The geological formation of these high ranges belongs to the Lower Silurian, and the minerals which exist there are composed mostly of grey copper ores, with a high percentage of silver, averaging from 40 to 150 ozs. per ton. In one of these veins I found bismuth, and Mr. Thomas Sewell is now engaged in the investigation of this lode and other lodes, and, no doubt, ere long we shall hear of some discovery of this metal being made, which may induce the promoters to continue their researches. The mine called Zarzosa, belonging to Don Manuel Lanzarote, which produces grey copper of 25 per cent., and 100 ozs. of silver, promises to become of some importance. Not far from Teruel we have also very rich manganese beds, averaging from 70 to 80 per cent. But the distance to the port of shipment (Valencia) is about 1*l.* 16s., and, at the present price of this metal in England, no shipments can be made. The beds average from 3 to 8 metres in thickness. I will refer in future letters to their geological position.

We have also the native sulphur seams, about 20 miles south-east of Teruel. These mines have been worked for half a century, and their produce finds a ready sale in Madrid and other towns of the interior, and is mostly employed in destroying the oidium, a cryptogamous plant, which attacks vineyards with tenacity. I have collected some most curious specimens, in a Palæontologic point of view, for our Mining College in Jermyn-street; and these consist of fossil sulphur, in the shape of Planorbis and Lymnea. These are fresh water species, belonging to the Miocene period, proving thereby that these beds were impregnated with solutions of sulphur at a very recent date, comparatively speaking.

On my arrival in Madrid I was introduced to Mr. Charles Ross, who has lately purchased from the Spanish Government the native sulphur mines of Hellin, in the Province of Murcia, and these mines very lately have received a most important addition to their value. The railway to the port of Carthagena passes only one mile from them, and the freight per ton to the port of Carthagena is 6s. These are the same class of native sulphur seams as those in the Province of Teruel, with the exception that no sulphur fossils are found in these; nor have I found any anywhere in my travels, except in the sulphur mines of Libros, near Teruel. I was requested by Mr. Chas. Ross to accompany him to the Hellin Mines, where he has established the Sicilian process for smelting these ores, a patent granted to the writer, in 1863, by the Spanish Government.

I will give you a description of this process in some future letter. It consists in using part of the sulphur, 3 per cent. of the ore, as combustible for extracting the rest.

I left the Hellin Mines, and travelled as far as Alcazas; there I took the train to Cindad Real and Almadenejos, which is the railway station of the celebrated Almaden Mines, and about four miles distant from them.

Persons desirous of visiting these most important mines should be made aware that, although there is a station called Almaden, some miles after passing Almadenejos, at this station there is no class of conveyance to these mines. The writer became aware of this fact most tangibly and practically, for he had to walk seven miles in a broiling sun, accompanied by a guide, leaving baggage at the Almaden station, to be sent back to the Almadenejos station, and to the town of Almaden. In my next I will forward you my impressions on visiting these mines, and their metallurgical department.

It is certainly wonderful in how short a space of time railways have placed so many mineral districts within easy reach of the traveller in this country.

The celebrated coal mines of Belmez and Espiel, placed now in connection with railways, are supplying by degrees all these localities with coals, and stacks are gradually appearing in these mining localities. No doubt good times for mining enterprise are coming for Old Spain.—*Almaden Quicksilver Mines, Oct.* 30. HENRY SEWELL.

## MINING IN CORNWALL.

SIR,—A very important discovery has been made in what is generally termed the Marazion district of the richest description of yellow copper ore; the lode will average from 3 to 10 feet wide, and is composed of some of the richest gossan seen for many years in the county of Cornwall, with abundance of mundic, white iron, &c. Such indications led to immense discoveries of copper in the adjoining mines during the present and last century. This lode is all in new ground for three miles in length, and parallel to the Old Wheal Fortune, Owen Vean, Tregurtha Downs, and Jewell Mines to the north, the Caroline and Neptune Mines to the east and south, besides several other mines of less magnitude in the same locality. These mines yielded several millions sterling in copper ores; in fact, the Old Fortune Mine lode is said to have yielded upwards of six millions sterling—the other mines just equal, if not to a greater amount. The Owen Vean Mine made such large returns in tin ores in the year 600, that the first code of laws, called the Stannary Laws were framed for the government of the tin mines in Cornwall. The Wheal Vor district, so celebrated for many rich mines in that locality, is just over the Tregoning Hill, a little to the east of the Marazion and Goldsithney group of mines.

This discovery is the result of operations commenced about ten years ago, and clearly proves that Cornwall has still an abundance of treasure undeveloped—one of the most important setts at present unwrought in the county of Cornwall, immediately adjoins the Jewell group of mines, a little to the north and west of the Owen Vean Mine, called the Tregurtha Downs Mines, famous for its yield of tin a century ago, and wrought to the depth of about 40 fathoms only from surface. When these mines were wrought—the Tregurtha Downs and Owen Vean—the price of tin in the ore was only about 30*l.* to 35*l.* per ton, the present price 70*l.* to 80*l.*

*Nov.* 9. A. BENNETT.

## SILVER MINING IN CORNWALL.

SIR,—A few words on the past history of silver mining in Cornwall may, perhaps, be interesting to some of your readers. Several mines have paid one or even two dividends from silver ores, but never (I believe) more than two. First comes Wheal Darlington, the ruins of whose engine-house stand near the West Cornwall line, between Marazion and Penzance; the silver ore raised here was very rich. Then came Rosewarne and Herland with rich ore also; we believe it paid at least one dividend. East Rosewarne also produced a small quantity. A mile further to the east, North Dolcoath paid a dividend of 1500*l.* from rich silver gossan, which failed in depth; several of the lodes in this sett were very promising, but only one was tried to any depth. Some silver ore was raised from one of the Entral lodes of Dolcoath. Near Menheniot, Wheal Wrey paid one or two dividends from silver, which, however, completely failed. In the Callington district, Wheal Langford was for a time very promising; and when abandoned the lode is said to have been promising for lead. Silver mining in the county has lately culminated in the shilling dividend of the Queen, a mine near Callington. The investing public require to see regular and steady sales of silver ore, taking place every month for some time, as in copper mines. Then they may invest in such concerns. ADVENTURER.

## CARN BREA MINES.

SIR,—With regard to the letter which appeared in last week's Journal I have taken some trouble to ascertain the facts. It appears from enquiries made in London and Cornwall that certain Cornish speculators have been most anxious for some weeks past to buy Carn Brea shares; none, however, offer, hence the letter to the Journal, and at the same time, and by the same writer, to a contemporary in Cornwall. There is no debt of 15,000*l.*, and the books are kept in admirable order. There has been a profit of upwards of 3500*l.* made this year, and the cash assets and liabilities about balance each other.

75, *Forrest-row, Dalston, Nov.* 10. —— AN ACCOUNTANT.

## WHEAL GRENVILLE—SOUTH CONDURROW.

SIR,—A few final remarks on the matters relating to the above mines. "A Shareholder in South Condurrow" labours under a great mistake in supposing that I had any desire to "pick holes" in our neighbour. My attention was directed to the statements made by Mr. Vivian at the South Condurrow meeting—statements which, being the reverse of facts I had represented to the Wheal Grenville Company, I was bound to reply to, or else to be under the imputation of having deceived our shareholders. Mr. Vivian does not attempt to dispute the correctness of my reply, because he knows my figures were taken from the working plan of South Condurrow, and are, therefore, indisputable.

As regards the remarks of "A Shareholder in South Condurrow" upon the capital expended on Wheal Grenville—the amount of calls that have been made is 7*l.* 15s. 6d. per share, and the number of shares now afloat is 5209—791 having been forfeited to the company. If we have called up more money than South Condurrow has, your correspondent should remember that our operations have always been spirited and vigorous, whilst at South Condurrow, until the present tin lode was discovered, the workings were never of a very energetic character. Wheal Grenville shares are just now at a heavy discount, but I am sanguine enough to believe that we shall yet see them at a considerable premium.

13, *George-yard, Lombard-street, Nov.* 9. JOHN WATSON.

## NEVADA LAND AND MINING COMPANY.

SIR,—I am informed that a statement has appeared in the Journal within the last few weeks to the effect that the Stetefeldt process for reducing silver ores, first introduced into Nevada by the above company, had proved a failure. I am sure that you will permit me most emphatically to contradict that assertion. Letters received from the Chairman of the company, as well as from residents in Nevada, confirm all accounts of the great success of the system, and the monthly summaries of results, which are sent to you for publication, are the best proofs of its value.

A report of the sale of some of the company's shares at the Open Stock Exchange at 7*s.* 8*d.*, quoted in your Journal of Oct. 29, was incorrect, as I learn on enquiry that the shares there offered were bought in, a bid of ⅞ths having been refused.—*Nov.* 10. JOHN A. ROBERTSON, Sec.

[For remainder of Original Correspondence see to-day's Journal.]

## THE BEST FUEL FOR THE NAVY.

TO THE RIGHT HONOURABLE THE LORDS OF THE ADMIRALTY.

MY LORDS,—The supply of fuel for the use of the Royal Navy has, since steam ships were used, been always considered a subject of great importance, for upon it depends in a great measure the practical existence of their motive power. Without a fuel of the best kind their powers cannot be developed, and the using of inferior fuel is, in its effects, tantamount to reducing them to an inferior class of ships. Your predecessors in office of every political shade took an interest in the matter, and for more than 20 years a series of reports of experiments of coals, tested and recorded at the various dockyards, shows the results of some of their labours. They had faith in the honesty and skill of their employees, and with the data such results afforded, they acted in a manner intelligible and generally satisfactory to that portion of the public with whom they had official intercourse. Their experience, my lords, you ignored, and departing from the tract in which they had walked, resolved upon pursuing another course. When you decided that the old tests should be cast aside, you determined upon the substitution of another method of trial, the fruits of which are seen in the return, published by order of the House of Commons, "for the six months ending June 30, 1869, showing the description and quality of coal consumed on board each ship of the navy, according to the particulars given in the half-yearly reports." This return embraces most of the steam coals of repute produced by the South Wales coal field, which your lordships are aware extends over Monmouthshire as well as Glamorganshire; and I think I shall not say more than the truth warrants if I add it is a fact within your lordships' knowledge that whilst Glamorganshire yields coal more or less anthracitic, Monmouthshire gives coal more or less bituminous. In the return made the difference in the two coals is unnoticed, the names of the coals themselves affording the only means of distinguishing the one from the other. Other coals besides them, the products of Scotland and the North of England, are also enumerated. The results of the use of all the coals are tabulated, not as scientifically as in the older returns, but sufficiently well to enable anyone, free from official opthalmia, to judge of the merits and demerits of each. The Glamorganshire and Monmouthshire coals stand upon a par with each other, with the exception of smoke, which the Monmouthshire coals in some cases emit in greater quantity than the Glamorganshire. The recorded results of the use of Scotch and North Country coals show them to be clearly and undeniably inferior to the Welsh in almost every essential quality constituting steam coals of the best description, exhibiting, on combustion, less power and more smoke. But these results were not new—they were simply and purely confirmatory of all past experience, and corroborate in every respect the results of the experiments recorded in the returns that you had rejected as aids to your judgment.

For reasons best known to yourselves you decided that a mixture of Welsh and North Country coals should be thenceforth the fuel to be used on board the Royal Navy. And you so resolved, my lords, in the face of irrefragable proofs, that you had in the South Wales coal field not only the more celebrated smokeless coals of Aberdare, but in the adjacent district other steam coals of equal power, but sufficiently bituminous, to mix with and give to them every attribute a steam coal is supposed to want. The next measure you adopt, as a sequence to your foregone conclusion in favour of North Country coals, is a direction for a series of experiments to be made to justify your decision. You selected the Lucifer, a vessel well adapted for the purpose of making these experiments, having ordinary furnaces such as are, I apprehend, to be found in most, if not all, the steamers afloat. And the reported result, my Lords, reads thus—"The expenditure of the mixed fuel was greater by nearly 14 per cent. than of pure Welsh; the amount of ash about one-third more." "The fires in the trial of mixed coal became foul after the third hour, and required pricking and the blast being put on. The getting up steam with mixed fuel was attended with such a quantity of dense black smoke as would in case of a number of ships prevent signals being seen, and be attended with other inconvenience." This, my lords, is the grand result, for all practical purposes, of the attempt to burn mixed quantities of Glamorganshire and North Country coals together. The subsequent trials made in the same ship with the improved furnace are of little comparative value, as it is not likely the improved furnace will be ever adopted, owing to the disadvantages it is manifestly subject to from its diminished grate surface, which unfits it for the combustion of Welsh coal. But with its use the result is thus recorded—"The consumption of North Country coal per hour has been about one-eight more than Welsh." "The smoke was rather more than double of that made with Welsh coal alone." And Admiral Key, in his minute commenting upon the proceedings, made subsequent to the last experiments, writes—"I need scarcely draw attention to the large consumption of North Country coals as compared with Welsh coal, which will certainly increase the annual expenditure, if North Country coal is used in large proportions; whilst it must be borne in mind that this coal occupies about 4 or 5 per cent. more space." The results of the experiments made on the Lucifer not being, I presume, satisfactory, the Urgent, a vessel better adapted no doubt to give the desired results, was resorted to for the making of further experiments, and the furnishing of additional data. Wise in his generation, the reporting officer mixes and muddies his report with that of the Lucifer, and gives a summary of the trials on both the vessels, by which he says it is demonstrated, amongst other things, that by the use of the improved furnace there is an apparent small saving of 4 per cent. in the use of Welsh coal alone, if fresh worked and of the best quality, as compared with the mixture of it in equal quantities with North Country coal, but that the great saving in using the mixed coal would be "more fully developed on foreign service, as the Welsh coal disintegrates very much, and requires a large mixture of the best Hartley coals to consume the small."

The present condition of things in relation to the use of coals by the Royal Navy and other steamers existed ere you had official life, and will remain so until means—better and more efficient than any yet known—are discovered for their improvement. The superiority of Welsh coal as compared with North Country coal is too clearly shown from actual experience, as well as by experimental trials in the return I have cited, to admit of an doubt. And it is equally apparent that so long as the present construction of furnace found in steamers generally is retained, so long a mixture of North Country and Glamorganshire semi-anthracitic coals will result in extravagance, if not mischief. The improved furnace is, for the reason I have assigned, a complete failure; but were the fact otherwise, years must elapse before it could be substituted for the kind at present used. And, my lords, suffer me to ask, for the information of the public, whether you have been and still are purchasing for the use of the navy the best steam coal, that of the greatest power, yielding the least smoke? The response of truth is in the negative. The approved fuel is the Admiralty mixture, or, in vulgar parlance, half-and-half—Glamorganshire and North Country coal being added together in equal proportions. But, my lords, when and where is the mixture to be effected? Were the two kinds put on board together at the port of shipment, an effectual mixture might perchance be made, but when shipped at different ports for a foreign station, it is palpable that the mixture of them is a more difficult matter. An equal or an ample quantity of each coal must be kept in store, and if in the hurry of coaling a steamer the required proportions were not maintained, but the weaker and more exceptionable coals supplied in excess, evil, if not mischief, uncertain in extent, and, therefore, immeasurable by any estimate, would be the result. Your specific, my lords, is believed to be a delusion—an artistic compound, attainable for scientific experiments of a few hours' duration in a vessel "well adapted for the purpose," but practically not procurable for general supplies, and the rough and ready requirements of the naval service.

The Government, of which your lordships represent a branch, have always been the advocates of economy and retrenchment. Yet you, my lords, with reports surcharged with the best of information before you, persistently act in opposition to both. A fuel dearer by 14 per cent. than pure Welsh coal, and attended, on combustion, by the most serious drawbacks, is preferred by you to another of unexceptionable quality. The loss upon "half-and-half" at 14 per cent. represents a loss of 28 per cent. upon the use of North Country coal alone; so that the use of North Country coals, my lords, costs the country about 5*s.* 6*d.* in 1*l.* more than the use of pure Welsh coal would do. Were you practically influenced by economical and commercial principles, you would buy in the cheapest market, and the cheapest goods would be not low-priced coals of bad quality, but such as would give motive power and satisfactory results at the least cost. Economy, my lords, may have been your boast, but in the purchase of fuel for the navy you have never practised it, and the road to retrenchment, in that direction at least, you have never trod. The gratuitous and unwarrantable commendation by your reporting officer of North Country coals on account of their being less liable to disintegration than Welsh coal, will not bear the test of investigation. Many of the Monmouthshire coals, it is well known to all persons acquainted with the productions of the South Wales coal field, are far less subject to disintegration than North Country coals; and some, from their known resistance to atmospheric action and the retention of their evaporative power in the hottest climates, are pre-eminently superior to them. You, my lords, can best explain why this class of Welsh coals has been systematically excluded from the Government purchases since your accession to office. You may possibly assign a reason why you have preferred, and still do prefer, the inferior to the superior coal. But you cannot justify the fact, nor will the public judge you lightly, should circumstances occur to show that you have hazarded in the slightest degree unnecessarily the loss of a single ship, or impaired its efficiency in the hour of danger, by supplying it with inferior fuel. Some of the excluded coals possess in themselves the desideratum you have in vain sought to obtain in the mixture of the two kinds you buy, and others would, as I before observed, impart their desired qualities to those of an anthracitic nature which they might be mixed with; but all their recommendatory properties avail not, so long as your present apparently fixed and immoveable determination to favour others and exclude them shall last. Favouritism, my lords, is dangerous. Take care that its spirit does not influence your better judgment, and you will be subject, at least, to one evil temptation the less. A WELSHMAN.

*London, October.*

## THREE DIFFERENT METHODS OF SINKING THROUGH RUNNING SAND.

Upon this subject a very practical paper was read before the South Midland Institute of Mining, Civil, and Mechanical Engineers, at their meeting in Wolverhampton, last Monday. The author and reader of the paper was Mr. JAMES COPE, F.G.S., mining engineer of that town, the hon. sec. The Chairman was Mr. J. P. Baker, the Government Inspector of Mines for the district, who is the President of the Institute. There was a considerable muster of members, who had been drawn together by the subject of the paper. Because of the wide importance of the theme to all colliery engineers in particular, and because the author has had very extensive experience in such work, we have taken steps to obtain as full a report of the proceedings as the rules of the Institute will allow.

Mr. Cope said: This important subject I have well considered from my long experience in several collieries under my supervision. Having tested these methods of operation, it gives me much pleasure in laying before you the different plans adopted by me to accomplish the same. You will perceive from the drawings made, showing each distinct method which will illustrate the principles requisite to surmount the very great difficult experienced in sinking through running or quicksand, and by which means a large amount of expenditure may be saved, and the operations may also be productive of good and beneficial results by extending and opening mines which have been heretofore abandoned, owing to defective sinkings. I will now proceed to give you the particulars of Fig. 1. After proving the thickness of the sand by boring with the usual appliances for such purpose, provide four strong deal baulks, 35 ft. long, and from 24 to 30 in. square, and frame them one across the other, as exhibited in the drawing. It will be necessary to form a diagonal framework to support the centre of the baulk, and to carry any weight you may require to lift: this framework will supersede the common pit-frame for winding up the earth with gin, &c. If the first stratum proves to be strong clay, combined with loam and sand of considerable thickness, it should be quartered in with 9-in. brickwork, after which apply strong hanging-rods or chains, with feet to clip the bottom of the curb, and tightened up with a screw wrench at the nut, or bur that is attached to the rods or chains which run through the baulks. The internal diameter of the first setting of bricking should be in accordance with the depth of the sand, and also the size of the shaft required; in my opinion, 12 ft. 6 in. in the clear will be sufficient under ordinary circumstances. The second setting, which will be about 11 ft. interior diameter, may be more difficult to sink through, as the surface-weight will press heavily upon the softer strata, and cause a bulging of the brickwork, in which case great care must be taken by lacing the shaft with elm boards, five-eighths of an inch in thickness, fastened from curb to curb with nails of the best quality, which will combine the whole work together. If you have much water in the strata apply a pump at once to keep it clear, and your work will be much firmer. When this setting is completed, fix the hanging as on the first or top setting, then proceed with the third, which will be the completion of your difficult top work, preparatory for the coffering. Coffering is a portion of strong brickwork, commenced upon a firm foundation, by placing an oak curb, made to a complete circle, which must be well bedded in cement, afterwards the coffering may be preceded with, and must be continued until the whole space required be raised 3 ft. above the top springs, or if necessary to the surface of the earth. It will be well to observe that the workmen employed for coffering pit-shafts, where there is a great quantity of water, cannot be too careful in mortaring with hydraulic cement, and well placing the bricks, as every joint must be crossed, and they must not let two joints come in contact one with another, or it is possible the coffering will burst, and the work become very much damaged. There should be three courses of brickwork in coffering out water in pit-shafts; the front course, the grouting course, and the back course; the grouting course must be sunk or placed about 1½ in. lower than the front and back course, to prevent the contact of the joints. I would recommend or advise all mining proprietors who have to coffer out water to make use of two plugs instead of one, and to bring up the air from the bottom of the coffering in a proper manner by wooden troughs, about 5 in. by 2 in. in the clear, perforated on the back side for carrying the air to the surface, then proceed to fill up the space between the back casing and the main coffering with good riddled soil, as this material is the best for coffering purposes. Above all, make use of the best black or hydraulic lime that can be obtained, as it will make your work stronger, and enable it to set in water. The best brick for making firm coffering is what is called the compass brick, as the joints fit both front and back; be careful to select well-burnt bricks, as soft ones will cause the work to decompose. As the coffering advances upward the lacings may be taken away, and used again for like purposes, if required.

The second plan is a method of sinking through running sand with tubs or cylinders, made either of cast or wrought iron, free from oxidation, and well coated with good naphtha black varnish, which must be allowed to become dry before being used, to prevent corrosion. I am in favour of wrought-iron, although many persons use cast-iron. It has been often the case that large portions of cast-iron cylinders have been ruptured by the ponderosity or pressure of the earth. The strength of cast-iron cylinders for a depth of 25 to 30 yards deep, ought not to be less than 1 in. to 1¼ in. thick, and made of the best grey iron. Wrought-iron cylinders should be ¼ in. thick, and made from the best plates that can be obtained. This will be found to be the most certain and substantial means of avoiding the inevitable difficulty often experienced in accomplishing the desired end. The proportions of the above sorts of materials are very often decided upon by men of no experience in such expensive matters. I have known the cost of sinking through running sand to a depth of 30 yards to be upwards of 5000*l.*, the greatest portion of which has been caused by the unskilful operator. The form of the bottom of the leading tub or cylinder, as is represented in the drawing, should be bell-mouthed; and the edge or cutting part as sharp as convenience will allow, so as to cut its way through the sand. It has been found by experience that when the tubs or cylinders have been made too broad at the leading or bottom end, that large stones have come in contact, and retarded the progress of the workmen's operations; and, again, the leading tub or cylinder of this description cannot penetrate into the earth like the one that has a cutting edge. When putting in tubs or cylinders see that the workmen are particular in jointing the work firm together, whether by being riveted or screwed together with gutta percha rings, ¾ in. in thickness, and well saturated with coal tar. The whole should then be screwed firmly together, and the flanges of the internal parts next to the circle of the shaft made perfectly water-tight. I must say I am in favour of riveting instead of screwing them together. The internal flanges should be about 5 in. wide, which will be sufficient to enable the brickwork to be laid thereon. When the tubs or cylinders are riveted or screwed together one upon the other, they may be suspended from a powerful pair of pulley-blocks, and lowered gradually as occasion may require. Sometimes it will require heavy pressure on the top of the tubs or cylinders to force them down; such will be the case when the earth is so much combined around them on all sides as to keep them from sinking with their own weight or gravity. After the tubs or cylinders have run their whole length till they have rested upon firm ground you may consider all to be safe. The next operation

will be to cleanse to the bottom of the tub or cylinder, to see whether any leakage prevails; if so, and it be not bedded regularly all the way round, it will be necessary to ease the parts a little that bind the most till it is quite secure. This will complete the most difficult part of the work.

The third method related to sinking by pile-driving. By this method (said the author) great difficulties have been overcome. It is seldom necessary to use piles in the first or top setting, which should be bricked with double bricking. In the next place, after you have sunk the top length, and made it safe by bricking and lacing down to the first bed of sand, then lay down your baulks at a proper distance one from the other, put on the cross-baulks and framework, proceed, then, at once to place your hanging chains or rods to the top setting, well screwed up to your baulks; dig into your sand, and if it will not stand, lay down your curb, well plated and screwed together firmly, and plumb your work. You will then proceed to drive your piles with wooden mauls, hooped with iron hoops near the face, and start the pile at an angle of 60°. This operation requires some muscular power, and will disable the best operators in a short time. The piles should be charred elm timber, about 7 or 8 ft. long, 1¼ in. thick, and from 4 to 6 in. wide. After you have driven down the whole circle of piles, apply about six wheelwrights' screw-jacks, and proceed to screw them, to force down the circle into the sand, so that you may cleanse and send up the sand as fast as you please. As the curb sinks lower and lower into the sand, till your jacks are quite up to the top, slacken them one by one, and set them upon plugs of wood till you have forced the curb low enough for the next set of piles. Then brick up from curb to curb, and make ready for driving the next set of piles as before. Move your hanging-rods to the last curb, take off the screw-jacks, and bed your pile curb. As it will be necessary, perhaps, to drive four or five sets of piles, the work should be well secured with good lacings, as directed in the foregoing part, because the pressure of the earth will gradually act upon them. As you proceed to cleanse the earth in driving the second set of piles, you will find that the first set of piles will be forced to a perpendicular against the setting below, by the unavoidable pressure of the earth acting upon them. By thus acting, the piles form a sort of tub, enclosing the brickwork. In this method of sinking it will require coffering, as in Fig. 1, which must be attended to as in the former coffering, and in precisely the same way.

The Hon. Secretary explained that he had not given the cost, because he did not wish the benefit of the information to go to the general public, through the reporters. He would, however, give the information in full in the next published volume of the Transactions of the Institute, where, too, the diagrams would appear.

The President, Her Majesty's Inspector of Mines for South Staffordshire, who pointed to the diagrams as the secretary proceeded with his paper, expressed himself in very high terms of the great value of the document. It was, he said, one of those papers which were of the utmost value to the Institute. The subject had not, however, been by any means exhausted. It was one which was of considerable interest to that locality, and was quite of moment to the North of England, and some other mining districts, in respect of which he was sure that no little astonishment would be felt by the members of the Association, if they only knew what had been the difficulties and what the class of work which had characterised sinkings through the sand there. The discussion upon the paper could not be conducted with so much certainty or so much value as would have been the case if the hon. secretary had given the cost of each plan respectively.

The reporters having intimated that they would give publicity to no part of the proceedings over which the Institute desired to possess the right of publication, the hon. secretary promised to bring the figures to the next meeting.

The President approved the step, and suggested that, till the next meeting, the discussion should be adjourned. (Applause.) The costs would be of the more value, because they were those which had actually been incurred under Mr. Cope's superintendence. Than Mr. Cope there was no man in that part of the kingdom better able to prepare a paper upon the question. (Hear, hear.)

When the President pressed the members to contribute as much information as their respective experiences afforded, Mr. Silas Bowkley proceeded to explain what was the plan which he, and he believed most of the mining engineers of the district, adopted.

The President interposing, expressed an earnest hope that Mr. Bowkley would make his remarks the subject of a paper, to be read when the discussion should be resumed. (Applause.)

In reply to Mr. Gilderoy, of the Prestatton Colliery Company, who, it was made known by Mr. T. Rose, a Vice-President, had come all the way from North Wales to hear the paper, the hon. secretary said that the system which he recommended was the second in order. When Mr. Gilderoy came to see the cost of that method, he would well understand why he recommended it.

After some reference had been made to a method by one of the members for making finished iron without puddling, which is mentioned in another column, the secretary drew attention to a visit which the Council had made to some sewerage sinkings at the east end of the Collegiate Church in Wolverhampton. These showed that the Permians existed there at the depth of 9 or 10 feet from the surface. The hon. secretary endorsed the statements upon the subject, which were made public in last week's *Mining Journal*.

Mr. E. Hull, M.A., F.R.S., F.G.S., the director of the Government Geological Survey of Ireland, was duly elected an honorary member of the Institute, on the proposition of the Past President, supported by Mr. T. Rose and others; and members spoke of the honour which the Institution acquired by having so distinguished a geologist and writer upon its list of members. In response to an invitation from the Past President (Mr. Henry Beckett, F.G.S.), Mr. Hull had consented to the election, in a letter read at the previous meeting.

The President declared the meeting at an end, and then drew the attention of the members to what had the appearance of a section of an immense fossil fish, that had been found in the steam coal in a colliery on the other side of the Rhondda Valley. It was shown by Mr. Thomas Walker, a member of the Institute, who has an interest in the colliery.

## SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE INSTITUTE OF MINING ENGINEERS.

On Monday evening the usual monthly meeting of members was held in the Museum of the Dudley Geological Society, Mechanics' Institute, Dudley. Mr. WILLIAM NORTH presided; and there were also present Messrs. J. M. Fellows, G. Spruce, B Callear, E. Davies, T. Parton, J. Cole, J. Lindop, J. Chappelle, T. Walton, T. Latham, R. Terry, J. Hughes, D. Peacock, W. Ness, T. Checkley, W. Blakemore, J. Ritson, W. H. Hall, J. Cooksey, and H. Johnson (hon. sec.).

A paper was read by Mr. THOMAS PARTON, F.G.S., on "The great Symon Fault in Salop Coal Field; is there Coal between the Black Country and the Shropshire Coal Field?" After speaking of the importance of the query contained in the paper, and describing generally the geology of the localities, the reader quoted the opinions of two persons on the subject in hand. One contended that although the two coal fields were doubtless at one time continuous, the mighty power of denudation had swept away a great portion of the coal field eastward on the Shropshire side. They defined the limits of its ravages on the west side, but failed to do so on the other. Judging from the thickness of the strata already proved to have been removed, they were of opinion that the denuding agency must have been so extensive as to remove the whole of the original deposit of coal between the two districts. The other persons admitted the denudation, but declined to believe in its severity. The paper that evening proposed to examine facts and figures, in order to test each theory. For several miles along the eastern boundary of the Shropshire coal field mining operations were cut off by the great Symon fault. The minerals and strata disappear—the highest in position first. There was no sign of a sudden dislocation by a "true" fault to account for the loss, but a gradual disappearance of the coal strata. At a point further east the workable coals are cut off, and these would be the limit of the Shropshire coal field. Mr. Parton here put in a section supplied to him by Mr. Marcus Scott, which showed the strange windings of the denuding stream, and said it showed that even the Stafford pits, belonging to the Lilleshall Company, had not escaped the enemy. There they had proved the "Symon" in the top coal. On the side of the South Staffordshire coal field the western boundary fault showed a striking difference to the "Symon" fault in the Salop side. Mr. Beete Jukes, F.G.S., in his "Memoir," said, "When the boundary of a coal field has been formed by simple denudation, without any faults in the neighbourhood, we cannot follow the beds of coal under the said rock without much regarding it; it is simply an additional matter of so much thickness interposed between the surface and the bed; and if the dip of the two rocks be known, and the surface be levelled, the depth of the coal can be calculated with the greatest facility. When, however, the boundary of a coal field is caused by a fault, the mere dip of the rocks is no longer a trustworthy guide to us." It was fair to say to say that Mr. Jukes at the time held a particular opinion, but after a minute examination of the geological features of the district he came to the conclusion that both the east and west boundaries of the coal field were not only genuine faults, clean cut fractures, but that they were produced late in the New Red Sandstone period, if not subsequent to it altogether. If they were prepared to adopt these corollaries, they might assure themselves that a part of the coal measures still rest in security beneath the deposits of Permians and New Red Sandstone. If, on the other hand, it could be clearly shown that along the western limit of the South Staffordshire coal field there were evidences of denudation defining it as the line of estuary, and inclining towards the Shropshire side, they might bemoan the loss of coal and iron which once existed continuously from the one field to the other. So far as he could judge from his observation, he held with the former theory, seeing no evidence to favour the latter. All along the line there were fractures and contortions in endless variety. The question then arose to what extent eastward had the coal measures been washed away from the line of the "Symon" fault, as proved in Salop coal field?

Mr. RANDALL held out little hope of coal being found in quantity between the two fields.

Mr. EDWARD HULL, F.G.S., referring to the district between Coalbrookdale and the South Staffordshire coal field, said it was probable that coal might be found extending from the east of Coalbrookdale to the area at Wolverhampton and Cannock Chase, but advised caution in experiments. The subject was a matter of discussion at a meeting of the British Association, and Professor Smyth, and other *savans*, favoured the opinion that the denudation was local, and did not affect the bulk of minerals between the fields. With the evidence before them, they could only come to the conclusion that denudation had swept away a portion of the coal field between South Staffordshire and Salop; that the western limits of the denuding stream were defined by the working of the mines in the Shropshire coal field, and that the eastern limit did not extend to the South Staffordshire coal field; that the western or boundary fault is a true one, therefore the other part of the once-continuous coal field is to the west of the boundry fault; and lastly, that for mining speculations and estates lying on the Staffordshire side, especially where the Permians were exposed, would be attended with considerably less risk and uncertainty than those on the Shropshire side."—A vote of thanks was given to Mr. Parton for his excellent paper.—The HON. SECRETARY (Mr. Henry Johnson) laid upon the table a section of "Jackey Pits" sunk at Sandwell. They were examined with considerable interest, and it was shown that at present neither water nor drifting sand had been met with. It was arranged that a discussion on the subject of Mr. Parton's paper should take place at the next meeting, and the members then separated.

## THE GENERATING OF GAS FOR GAS-FURNACES.

### THE ALBION STEEL AND WIRE WORKS, SHEFFIELD.

The opening of a new wire and steel works, by the well-known firm of GRAY and Co., of the Albion Works, Sheffield, brought together, on Friday last, a large number of the leading gentlemen of the town and district connected with the steel and iron trades, whilst America was also represented on the occasion. In addition to the new wire mills, which are not excelled by any in the kingdom, there was the still greater attraction of being able to see at work the new patent system for generating gas to be used in the heating-furnaces, and of which report had spoken most favourably. The furnaces and apparatus were erected under the immediate superintendence of Herr Julius Frölich, the patentee for "Improvements in Apparatus for Generating Gas to be used in Gas-Furnaces." That the invention of M. Frölich is a really valuable one, and in every way eminently successful, was admitted on all sides by those who witnessed the admirable manner in which it worked at the new establishment, being entirely free from that stiffness so usual in new inventions until they have been in operation for some time. Not only was the flame of gas pure, but the temperature was high, and at the same time uniform. The fuel used in the production of the gas was ordinary small coal, whilst, apart from the economical advantages, it may be stated that the furnaces and their vicinity are quite cool, there is an entire absence of anything in the shape of smoke, and there is an appearance of cleanliness unusual at the ordinary furnaces. Considering the thorough satisfaction which the new system afforded to the many practical men who were present on Friday, and examined all that related to it to the minutest detail, there appears to be little doubt but the success of the invention, as seen at the Albion Works, will lead to its being generally adopted at the other establishments in the Sheffield district, as well as in other parts of the kingdom. Whilst there is, therefore, every reason to believe that Herr Frölich will receive ample remuneration for his valuable invention, great credit is due to Messrs. Gray and Co. for the confidence they have shown in adopting a system involving considerable outlay, but which they had not the opportunity of seeing in operation.

The apparatus for generating the gas is in itself simple, and consists of two fire-brick chambers connected at the bottom by a short flue. The first chamber contains the fuel in a powdered state, such as small coal, coal-dust, sawdust, or peat, and is fed from time to time at the top. The fuel descends by gravity, and is burnt by the aid of fan blast entering through a number of tuyeres near the bottom of the chamber. The gaseous products of this combustion pass through the flue into the second chamber, which is supplied from time to time by a door placed at or near the top with coke or large pieces of non-bituminous coal, so that all the gases resulting from the combustion in the first chamber are forced to ascend through a column of red-hot coke. The gas is thus converted into carbonic oxide, and is then ready for use, and the carbonic oxide gas thus produced may be burnt by either hot or cold blast as the process to be carried out requires a higher or lower degree of heat. For this purpose the gases are led into the furnaces in which they are required to be used, which may be a reverbatory furnace, or a steam-boiler furnace, or other furnace, and air, either heated or cold, is admitted in suitable quantity to burn the carbonic oxide into carbonic acid gas. The same blowing apparatus which forces air into the fuel chambers may be employed to supply air to the furnace in which the gas is burnt. The principal objects obtained are the ensuring a complete utilisation of all combustible matter contained in the fuel, the producing of a constant and pure gas flame of high temperature, whilst the cost of applying the apparatus is comparatively small, when compared with the advantages obtained. There is no complicated work, and the invention being free from elaboration in details can scarcely get out of order. Indeed, its very simplicity is not the least recommendation of Herr Frölich's invention. The two chambers are constructed at the end of the furnace beyond the bridge, a short flue or passage connecting them together. The outer wall of the chamber is supported by the iron casing of the furnace, which is cast with a sill to receive it. The partition between the chambers is built upon a double arch of fire-brick, so that when the partition is burnt away at its lower part, the bottom arch may be cut out and rebuilt, without disturbing the work above it. The bottom of the flue or passage is built upon a cast-iron flap, which is supported by two latch-plates, either of which would support the flap, by which means access may be had to the bottom lining to repair it when necessary, or to remove clinkers or ashes. The quantity of air passing to the tuyeres is regulated by a valve, there being a blast-pipe or passage formed in the bridge, supplied with air from the blast-pipe, the air issuing by a number of perforations in the top of the bridge. The blast at the bridge is regulated by a valve, a pressure of blast of 3 or 4 in. of water being sufficient.

In noticing the new works, it may not be out of place to refer to the great increase which has arisen during the last few years in the demand for iron and steel wire. Formerly the trade was in a great measure confined to the finer qualities for needle-making, hooks, and iron wire for bonnets and mechanical purposes, the quantity consumed being truly infinitesimal as compared with late years, and the business in the hands of a few houses. At present, however, there are uses to which wire has been adapted that were scarcely dreamt of little more than 20 years ago, but which now tax the efforts of numbers of firms to supply, and afford an ample field for the genius of inventors in providing machinery and appliances calculated to increase production. The introduction of the telegraph system, land and submarine, wire-ropes, and rigging, and various other articles now made of iron and steel, which were not formerly made of those materials, have led to such a demand for wire that it has become an important branch of our national industry. The vast network of wires which now encircles the globe, and brings the most distant countries within a hour or two of each other, are but an instalment of what time will develope, so that the production of telegraph wire has yet to see its prime. Most countries of importance will desire to have a system of their own, and "put a girdle round the earth," or a large portion of it at least, so as to have it at their own command.

With reference to the new works, however, we may say that they are admirably laid out, and replete with all the necessary machinery of the most improved description for doing a very large business, and also for economising labour as far as possible. The furnaces are well arranged in connection with the mills, and there is a very fine stack at no great distance from them, and from which scarcely any smoke was emitted. There are four mills, comprising an 8, 12, 14, and 19-in. train, and all of the best construction. The 8-in. train, which was at work in making No. 5 guage wire, is a very fine one, and it was said could not be excelled in the country. It certainly worked remarkably well, and on a piece of steel some 4 or 5 ft. in length, and weighing about 1 cwt., being put into it from the furnace it was rolled out into a length of something like a quarter of a mile, and coiled up ready for transportation in about a couple of minutes. The mill was worked by a coupled engine of 150-horse power, and which will also, we understood, drive another one. Another of the mills, which was engaged in rolling out Bessemer steel in lengths of 40 or 50 ft., and from 3 to 4 in. in breadth, was worked by a pair of horizontal engines, 32-in. cylinders. The steam from the engines is condensed. There are four boilers, about 23 ft. long and 7 ft. in diameter, being those patented, and made by Galloway, of Manchester. There are the usual cutting and other machines, and all the necessary essentials for the carrying on of an extensive business according to the best and most economical methods. The new works, although separate and distinct, join to the well-known establishment of Messrs. Gray and Co., where other steel is very largely produced.

After examining the furnaces and machinery, a large number of gentlemen were invited into the principal office, which had been improvised into a handsome banqueting room for the occasion, and in which was laid out a choice and elegant repast. The viands included the choicest edibles, and the wines, sparkling and still, were of well-appreciated vintages. The chair was occupied by Mr. G. Gray, the vice-chair by his nephew and partner, Mr. Fox. After the usual preliminary toasts had been disposed of,

Mr. HUNTLEY (Brown and Co.) said he was much pleased with the manner in which he had seen the steel heated and rolled that day, and it must be most gratifying to the Messrs. Gray to have been able to see their new works all but completed within six months. It showed the energy that must have been brought to bear in converting a mere barren waste into a large and complete establishment, with machinery and fittings. He was convinced that the money had not been badly laid out, but that the works would be a source of profit to the spirited proprietors, who would be in a position to make the material which they produced at least as cheap as any others could do. He begged to propose "Success to the Albion Wire and Steel Works." (Cheers.)

Mr. G. GRAY, in acknowledging the toast, said that in March last not a spade had been put into the ground, and—rather an unusual circumstance, he believed—even the contractors got their work done rather sooner than the specified time. He hoped the works would be as successful in the future as they had been in their opening. They had now as good a mill as any in the country, and the firm intended doing business in a fair and straightforward manner. If they could not succeed by so doing, then they would retire from business altogether. During the progress of the work they had the services of two eminent engineers, which had enabled them to put the machinery and furnaces as they had seen them, and the firm was indebted to those gentlemen for what they had done in hastening the progress of the work.

The health of the contractors, Messrs. Walker and Eaton, and Messrs. Davy Brothers, was then proposed. Mr. DAVY, in reply, said Messrs. Gray and Co. had now a mill equal, if not superior, to any in the kingdom or in the world. Great praise, he considered, was due to Mr. Fox for the unabated interest he always took in the progress of the work, and also to Mr. Shelton, the engineer.

Mr. G. GRAY then gave the health of Herr Frölich, and expressed a hope that the connection of that gentleman with the firm would last for many years to come. He was one in whom they all recognised high talent and amiability, and whose services were appreciated.

Herr FRÖLICH said, although his invention might not deserve so much praise as he had received, yet he was grateful to those gentlemen who had given him an opportunity of bringing it to a practical test and before the public.

Mr. SWIFT proposed the health of Mr. Fox, the managing partner, as one of the most important toasts next to that of success to the works, seeing that were it not for his indomitable perseverance, energy, and business habits the firm would scarcely be in the position it was. He knew that those abilities were fully appreciated by his uncles, the Messrs. Gray, and were aware that the success of the Albion Works mainly depended upon him. (Cheers.)

Mr. FOX said he felt obliged for the very flattering manner in which his health had been proposed, and also for the kind wishes he had received on that occasion. So far as he was able, and with what abilities he possessed, he would do all he could to obtain the good opinion of all persons with whom the firm did business, and in the promotion of the interests of his partners and himself.

The CHAIRMAN then gave the healths of the invited guests present.

Colonel GOURAND, in the absence of General Starring, thanked the company for the kind manner in which the toast had been received. He had had the honour of serving five years under General Grant, and had acquired one of his well-known characteristics—never to make a speech. He would, however, say that he had been greatly pleased at what he had seen done, not only by the mills, but by the system by which the steel was heated.

Several other toasts were proposed, in answer to which allusion was made to the valuable character of the means adopted for heating the metal, and also with regard to the mill itself, which it was stated now stood second to none in the kingdom.

## DIAMOND MINING IN NEW SOUTH WALES.

### BY MR. JOHN HUNT, SEN.

(Late Manager of the Australian Diamond Mining Company's Works).

The greatest quantity of diamonds obtained up to the present time may be said to have been washed from the alluvial drift at Reedy Creek, Two-Mile Flat, Hassall's Hill, Horseshoe Bend, Rocky Ridge, and a few other places on the borders of the Cudgegong river, Mudgee. The gravelly matter washed from the bed of this river has produced diamonds also, but, owing to the frequent floods, which have proved a sad drawback on mining operations, no extensive trials have been made; indeed, the placing of heavy machinery on the river would be hazardous, particularly in the winter season. As soon as the rivers get low it is not unlikely that portable machines will be used with some success in obtaining both gold and diamonds.

This new branch of industry (diamond mining) may be said to be in its infancy in this part of the globe, and it will require money, time, perseverance, and practical experience before anything definite can be said as to its becoming a commercial success. It is wonderful how soon men, women, and children in this district have learnt to know what a diamond is, but the study of the various gems and other stones which accompany the diamond in the alluvial drift have not received that attention which is necessary to enable the miner to judge as to the probability of success or otherwise.

It is quite true that the diamonds are found more or less patchy, as the miners call it; for instance, at Reedy Creek a piece of ground about 900 superficial yards produced from one to four diamonds to the load, and about 2 pennyweights of gold, which is invariably found more or less with the diamonds. The alluvial drift in this particular spot averaged about 3 feet thick, but, strange to say, outside of the area above mentioned for some little distance the drift contained scarcely one diamond to five loads. Here, like in many other mining operations, is a difficulty not easily overcome, in selecting payable drift, but the diamond miner may hope for success in a diamond district when the following precious stones and minerals are found in the drifts—rubies, sapphires, zircons (generally too small to be of any value) pleonaste, topazes, Barkleyite, and a variety of the corundum family, easily known by its hardness. Next, but not least in importance as a guide, is a black siliceous stone, with a smooth shining surface when rubbed with the hand, some of them not unlike a black kidney bean in size and appearance. Rather harder and of somewhat greater specific gravity than common quartz, a kind of opaline quartz, about the size of a small pea, is also found, and some brownish quartz crystals, which appear to have been derived from decomposed granite, accompany the drifts more or less. Petrified wood is also found in some places, in which the carbon of the wood seems to have been replaced by silica.

I will now call attention to a green mineral, which I have never found except in a diamond district. The colour green is caused by the presence of phosphate of iron. In examining some of the alluvial drifts it looks as if the phosphate of iron had been formed since the drift was deposited. That this particular mineral is found in diamond-producing districts, not only in New South Wales, but elsewhere, is a fact known. Mr. John T. Hunt visited a place in South Australia some months since where diamonds had been found, and he brought me back a piece of this green mineral (phosphate of iron), which I recognised as the same kind as that I had found here. It would be a task to enumerate all the different stones and minerals found with the diamond; but the before-mentioned, with few exceptions, are what I have found the most conspicuous as a guide in working the diamond-producing drifts. In some places most of the gold and diamonds are in the upper part of the drift; in others it is towards the bottom. In such cases, a trial on a small scale by a man conversant with the usual indications would save both time and labour. The geological features of this district have been so well described by geologists, that it is not necessary to refer to it, beyond the fact that the greatest quantity of diamonds is found in the drift, either covered by or near the basaltic rocks.

Up to the present about 5500 diamonds have been recovered; the

largest weighed 5¾ carats, and the smallest I have yet seen was about one-tenth part of a grain. The average weight is found to be about one grain each. The greatest part of these stones are beautifully clear; but a few red, green, yellow, and black have been found. I have only found two or three stones approaching the inferior kind of diamond called boart; but I have no doubt it will be found ultimately in greater or less quantities. At present few people know what it is when they see it. Like mining for the glittering gem, it has to be learnt. A few diamonds have been picked up accidentally, and some have been got in washing for gold in the cradle (a very imperfect principle for saving fine gold and precious stones), but the great bulk have been saved in Hunt's Patent Gold and Diamond Washing Machine, which, when properly worked, loses neither fine gold nor precious stones. There are at present eight or ten of these machines on the different diggings.

The mode of washing the alluvial drift at the Australian Diamond Mines Company's works is as follows:—The drift is carted to an inclined platform boarded on each side, at the bottom of which is a cast-iron plate 2 ft. square, made with conical holes, the upper part being ¼-in. in diameter; on this the matter under treatment is drawn, and a jet of water falling from a height of 6 ft. washes off the adhesive clay, &c.; and all that goes through the perforated plate, which is facilitated by moving it about under the jet of water, goes down a launder, placed at an angle, to a box from which the machine is fed; the surplus muddy water escapes at the side. After about ten loads have been operated upon, the contents resting on the finely pierced copper plate are removed and spread on a sort of table, and the diamonds picked out, as well as other gems of commercial value. In working the small portable machines, the mode of separating the adhesive clay and stones in the wash-dirt or drift is varied according to circumstances. The fine gold passes into the body of the machine. Except under very favourable circumstance, less than 2 dwts. of gold and one diamond of the average weight to the load will not be found very profitable whilst wages remain at the present rate.

## THE SOUTH AFRICAN GOLD AND DIAMOND FIELDS.

An interesting lecture on this subject was delivered by Sir JOHN SWINBURNE, Bart., at the inaugural meeting of the Newcastle Literary and Philosophical Society, and as the lecturer was enabled to give his own experience of the country his narration was listened to with unusual pleasure. The monotony of the journey from Rustenberg to the Tati is very great, nothing but the interminable bush with none of the beauties of the tropical forests in moist climates. The Tati river is 82 yards wide, but it is only during the rainy season that the water shows above the sand. Sir John explained that on its banks was the Tati settlement in 21° 27′ south latitude, and 27° 40′ east longitude, and elevated above the sea 2623 feet. The southern gold fields, as far as the actual metal had been found, extended from N.W. to S.E., a distance of 40 miles by 14 broad. There were five different mines within a mile of the settlement—two a distance of three miles to the S.E., one 13 miles N., two 12 miles and one 35 miles up the river to the N.W. of the settlement; making a total of 11 mines which had actually been worked, and from which gold had been extracted. Besides these there were numerous other reefs where gold had been discovered, but these had not yet been worked. In most of the mines two shafts had been sunk to an average depth of 50 feet, but one had reached 100 feet. All these mines were upon the site of ancient workings, and the original miners appeared to have been good workmen, as they had invariably extracted all the richest ore as far as they went. No tools had been discovered, but stone mortars, evidently used for crushing the ore, had been found on the banks of one of the mines, the reefs of which had been worked more after the style of quarries, and leaving great holes or pits of a depth of 70 feet.

Who had worked the mines in former years was, of course, a matter of conjecture; but there were trees now growing on the workings that must have taken 150 or 200 years to grow. The most probable inference was that they must have been worked either by slaves or by some of the more intelligent natives, as a great quantity of gold was carried away to the north and sold to the Portuguese; and records actually showed that considerable quantities were taken to the Zambesi, and thence conveyed home to Europe. As much as 12 lbs. avoirdupois was at one time the annual produce of that part of the country. The reefs consisted of quartz between walls of chloritic schist; the strike being from N.W. to S.E., the dip about 50° to the S.W., and varying from a few inches to 6 feet in width. There were two descriptions of quartz, one red and one honey-combed, and containing much oxide, peroxide, and some white sulphides of iron; while traces of sulphurate and carbonates of copper were also found. The gold, which was very fine, was mostly found in the oxide and peroxide of iron, and was only now and then seen in the white quartz without iron. The other kind of quartz was of a blueish grey appearance, without any iron, and of a finer texture; but it was only found three miles to the eastward of the main Tati settlement, in a vein 6 feet wide, and the gold therein was coarser and more evenly disseminated than in the red ore. Two shafts had been sunk upon this vein to the depth of 60 feet without meeting with either sulphides or oxides of iron. The Limpopo Company's mill was at the present time crushing quartz from one of these mines, and as it was being steadily worked, and produced about 1½ oz. of gold to the ton, it was considered highly satisfactory—an ounce being considered a high yield in Australia and the Brazils.

With regard to the northern gold fields, it appears that they lie to the N.N.E. of the Tati, a distance of about 327 miles. The whole of the country between Inyati and the Ramakoban were described by the lecturer as having quartz reefs and schistose rocks interspersed through it, more particularly in the neighbourhood of the Kumalo river; but he was not aware of gold having actually been found in any or those reefs. About 100 miles eastward of Inyati they came upon the Bembees, the southern boundary of the northern gold field, and in this neighbourhood there were numerous quartz reefs in which gold had been found. Proceeding 25 miles to the north-east, they reached the Umniati river, and from thence to the Umfuli river was 45 miles more, making a total distance of 170 miles from the Inyati Mission House. Some 3 or 4 miles west of the ford at Umfulinoer, a couple of shafts had been sunk to a depth of 35 or 40 feet upon one of the reefs, that had produced gold in small quantities, but both had had to be abandoned in consequence of the return of all white men being insisted upon by the Matabele. The reef was 2½ feet thick; the quartz very similar to the red quartz containing iron found at the Tati. All over the surrounding neighbourhood there were the remains of ancient workings, and on some of these reefs gold had been found. Whether these reefs would be found as rich as those on the Tati, or even remunerative, was still doubtful. The latitude of those workings was 18° 11′ south; longitude, 30° 34′. Tati was 205 miles, and Zumbo on the Zambesi river, due north 160 miles distant.

The road the whole way from Inyati to Ganyami, a distance of 200 miles, skirted the fly country, but it was probable that a route for ox-wagons might be found free from fly all the way through to the Zambesi at Zumbo. Finding, on his arrival at Umfuli, that his provisions had run short, he determined to proceed to the south-east, but had great difficulty in inducing his attendants to go with him into the Mashua country, the Matabele being naturally afraid to go there in small parties, being fearful of being attached and murdered in retaliation for the sufferings caused by their raids. After a week's journey of about 90 miles over undulating sandy plains, without much wood, they arrived at the summit of the water-shed, when a beautiful view burst upon the eye; the high rocky mountains, with deep valleys full of running streams, with fine timber, being a most gratifying relief to the uniform slope of the western side of the hills. In fact, the eastern side was an entirely different climate, and inhabited by an entirely different race (the Mashunas) from the Matabele country. They manufactured cloth and iron, and were essentially a mercantile race; never fighting except to defend themselves and their herds and flocks from the filibustering expeditions of the dreaded Matabele. Sir John described some of the habits of these people, and their process of smelting iron ore; observing that these Mashunas worked most neatly in copper and iron, and made axes and very small iron and copper beads. The apparatus with which the smelting was accomplished was made on the spot, as also the charcoal.

Referring to the diamond fields, he said that he had never visited them himself, but from what he had been informed by travellers and others, the production of them must be something enormous. He did not think, however, that the ladies need flatter themselves that the diamonds would be any cheaper in consequence, as it had been stated that when large quantities of them had been sent from Brazil they had not any effect on the value; but still, perhaps, the discovery might be the means of stopping the rapidly-increasing value of those gems. As regarded anyone going out to look for diamonds, he could tell them that they must be prepared to work like a navvy in a burning sun, and that the average earnings were only something like 200*l.* a-year. They all heard of the lucky finds, but it must be remembered that they were seldom or never made aware of the thousand and one instances where men were fairly beaten and broken down, and had to leave the place in search of quieter work elsewhere.

## FOREIGN MINING AND METALLURGY.

The shareholders in the John Cockerill Company have approved the balance-sheet presented to them for the year ending June 30, 1870. The results of the exercise are stated to have been favourable, and the shareholders will receive a dividend of 2*l.* per share. A new mechanical concern is about to be organised, under the name of Le Flandre. The directors of the Belgian Company for the Construction of Machines and Railway Plant have just presented their report for the year ending June 30, 1870. They state the exercise just traversed has been a prosperous one. The company purchased last year new tools to the value of 5496*l.*, but the whole cost of these was charged to revenue, so that no addition was made to the capital account. The sinking fund, formed for the renewal of plant and buildings, has been carried to 26,744*l.*. The amount of work executed in 1869-70 in the company's establishments showed a considerable increase upon the year 1868-69; and the works are still very actively employed. The reserve fund is still increasing, as the interest accruing upon it is added to it. In consequence of the war, the directors have deemed it prudent to form a fund of foresight, and it amounted at the close of June to 2880*l.* After making all deductions, the profits of the year stand at 8790*l.*; and the shareholders will receive a divident of 2 per cent., in addition to statutory interest at the rate of 5 per cent. per annum. The total return upon the share capital for 1869-70 will thus be 7 per cent. The company's works are assured employment for some months to come; but, of course, in the present state of affairs, the future is not altogether free from anxiety. The conclusion of peace would, it is expected, give a great stimulus to affairs.

The Belgian coal trade has presented little change. There is comparatively little doing on foreign account, and although the extraction is reduced stocks are increasing. It is an ill wind, however, which blows nobody good. Thus the capitulation of Metz is expected to re-open to Belgian coal-workers the basin of the Moselle, if the proprietors of the blast-furnaces and rolling-mills of that district can muster sufficient courage to put their works again in activity,—a result which does not seem to be altogether assured, as under any circumstances some time must elapse before industrial affairs can resume their ordinary course in France. The continuation of the war threatens to expose Belgian metallurgical industry to cruel trials, and although the Government has come to the aid of the works to the utmost possible extent, still, if new orders do not arrive a time may come when it will be necessary to considerably reduce the production. The dividend of the Jemmapes Rolling-Mills, Forges, and Foundries Company for 1869-70 has been fixed at 10 per cent. per annum. The Vieille-Montagne Zinc Mines and Foundries Company commenced the payment on Wednesday of the second half of its dividend for 1869, or 8s. per tenth share. The Sacre-Madame Colliery Company is paying its half-yearly obligation interest. The Charleroi United Collieries Company is paying a dividend for 1869-70 of 1*l.* per share; and the Central Belgian Rolling-Mills Company is paying a dividend upon its preference shares.

The French and German copper markets have not presented any change of importance. At Havre, Peruvian mineral (pure standard) has made 70*l.* to 70*l.* 10s.; United States (Baltimore), 76*l.* to 78*l.*; ditto Lake Superior, 80*l.* to 86*l.*: Mexican and Plata in bars, 66*l.* to 68*l.*; old yellow copper, 40*l.* to 44*l.*; red ditto, 62*l.* to 66*l.*; ditto bronze, 62*l.* to 66*l.* per ton. At Marseilles, Toka for consumption has made 76*l.*; Spanish, 68*l.*; refined Chilian and Peruvian, 76*l.*; and rolled red copper in sheets, 80*l.* per ton. Tin has been generally rather heavy, with less business doing. The annexed table shows the deliveries of Banca in Holland for the first ten months of the last three years:—

| Month. | 1868. | 1869. | 1870. |
|---|---|---|---|
| January .....Blocks | 6,650 ..... | 17,500 ..... | 13,300 |
| February ..... | 11,000 ..... | 11,101 ..... | 6,173 |
| March..... | 10,100 ..... | 7,100 ..... | 12,417 |
| April ..... | 14,748 ..... | 5,350 ..... | 16,700 |
| May..... | 11,739 ..... | 3,400 ..... | 12,300 |
| June ..... | 14,100 ..... | 4,500 ..... | 12,626 |
| July..... | 7,100 ..... | 7,322 ..... | 7,230 |
| August ..... | 10,710 ..... | 7,900 ..... | 4,193 |
| September..... | 12,170 ..... | 10,399 ..... | 6,226 |
| October..... | 14,720 ..... | 21,964 ..... | 23,499 |
| Total ..... | 113,037 ..... | 94,536 ..... | 114,664 |

The stock on schedules, Oct. 31, 1870, was 105,051 blocks, as compared with 110,617 blocks, Oct. 31, 1869, and 140,759 blocks Oct. 31, 1868. The unsold stock of the Society of Commerce, Oct. 31, 1870, was 70,244 blocks, as compared with 23,714 blocks Oct. 31, 1869, and 44,010 blocks Oct. 31, 1868. Advices from Batavia announce that a public sale of 6000 piculs of Billiton was to take place last month (October). Banca has been quoted at 73 fls. at Rotterdam, while Billiton has made 72 fls. upon the same centre. At Amsterdam the quotation for Banca has been 73½ fls., while Billiton has made 72½ fls. Zinc, like tin, has been a little neglected. Stolberg lead has made 11 fls., and miscellaneous German marks 10¾ fls. at Rotterdam. At Marseilles lead in saumons, first fusion, has made 18*l.* 4s. per ton; ditto second fusion, 17*l.* per ton; ditto argentiferous, 17*l.* 18s. per ton; ditto in shot, 20*l.* per ton; ditto rolled and in pipes, 20*l.* 16s. per ton.

## FOREIGN MINES.

DON PEDRO NORTH DEL REY.—Mr. F. S. Symons, Sept. 29: Produce weighed to date, 3717 offs.; estimate for the month, 5217 offs.—Mine: Dawson's pumping-engine continues to work well at present, drawing about 7 cubic feet of water per minute, with 75 strokes. Length of rods to Vivian's shaft 370 fms. The sinking is progressing in a satisfactory manner. The work excavated has been of low standard—none sufficiently rich for boxes. The explorations on the lodes at Alice's West are being vigorously prosecuted. Line No. 6 not defined, and poor. Good progress has been made at Treloar's level. At the middle adit the ground is wet and bad, owing to a run; a side level has been commenced. A force has been kept working at Mato das Cobras. Corrego is being sampled; five samples have shown grains of gold. A cross-cut will be commenced shortly.

ANGLO-BRAZILIAN.—Little alteration to note; works progressing steadily. In about eight months we hope to communicate to the Fundao lodes at a much deeper horizon than at present worked on; the end to attain this is being vigorously pushed on, as well as the deep adit section.

ROSSA GRANDE.—Mr. Ernest Hilcke, Sept. 28: There is little or nothing new to note in the mining department; the operations have progressed steadily, and at Mina da Serra a slight improvement in the size of the lode is manifesting itself in the stopes above the 40. Our produce for the month will exceed that of the previous month, I hope, by about 500 offs.

GENERAL BRAZILIAN.—Capt. Thos. Treloar, Sept. 28: The general operations have presented no feature calling for remark—all is going on well, but the ground in the shallow adit at St. Anna is still wet and troublesome. The men, however, are struggling against it manfully, and are conquering it. We have had some rain, but, on the whole, the weather has been splendid for our operations, and, as far as our works are yet concerned, dry weather is more advantageous for us than wet. Though the water in the water-courses is little, we do not yet require more.

TAQUARIL.—Mr. T. S. Treloar, Sept. 28: The works connected with the stamps, &c., are in a forward state, and would, I believe, have sufficiently advanced by the end of next month to enable us to commence stamping but for the non-arrival to date of the gudgeons. These, though forwarded from Barbacena on the 5th inst., and notwithstanding special arrangements made to get them here with as little loss of time as possible, are still on the road, owing undoubtedly to the bad state of pastures, compelling the bullock drivers to make unusually short journeys. During the last fortnight we have roughly treated about 2 tons of general work broken from the second lode in the old workings, and derived therefrom 13 ozs. 15 dwts. troy of gold. This return more than warrants our expecting grand results upon completion of stamps. The rich shoots descending are under water, and all works upon them must remain in abeyance until we commence stoping operations.

BATTLE MOUNTAIN (Nevada).—Wm. Nancarrow: Virgin Lode: The lode in the 73 ft. level north still continues poor. No change, so far, for the better. The winze sinking below this level is down 30 ft., and the lode appears to be split into two parts, one to the west and the other to the east, and the winze is between the two. I purpose sinking some 10 or 12 ft. further, and then cut crosswise, first west and then east, to ascertain which is the richest part. The north stope, in back of the above level, is still turning out good shipping ore.—Lake Superior: The lode in the south level is 4 ft. wide, and looking well indeed; we have the ore now from the bottom to the back of the level. Th a very good lode. The lode in the north level is 3 ft. wide, producing real stones of ore, but the principal part of the lode is composed of iron. This promises very well.—Hallow's Ledge: We are still sinking the shaft on ledge; the lode promises well for the future; it is still from 3 to 4 ft. wide, we take out a few sacks of good ore occasionally.

CHONTALES (Gold and Silver).—The directors have advices f Mr. Belt, *via* New York, dated Oct. 8. Returns of gold for September, 304 from 954 tons of ore; average yield, 6½ dwts. per ton; cost for the month, Mr. Belt states that San Antonio Mine is opening out upon a good run o and he fully anticipates increased returns for the next month. The healt the establishment is good.

ALMADA AND TIRITO (Silver).—The following, dated San F cisco, Oct. 21, has just been received from the head mining engineer of the pany:—"While waiting for the steamer I spent some days amongst the mines at Washoe, including the celebrated Comstock Mine. Without atte ing comparison, I may say I return to Mexico quite as sanguine of the succe your mine as previously." Mr. Clemes was to leave San Francisco for M by the Idaho the next day.

EXCHEQUER (Silver).—Lewis Chalmers, Oct. 10: The air-shaft made 8 ft. last week, put in two sets of timbers, and run out 31 loads of the shaft is now up 120 ft. The shift at work in the north drift, at the 80 level, run 8 ft., and took out three car loads of good ore; this drift is now in The shift in the east drift, 100 ft. from the 50 ft. level, has made 3 ft. i east and 3 ft. in the north drift. The windlass shift have raised 370 bucke water, 54 loads of dirt, and three loads of pay ore.

VAL ANTIGORIA (Gold).—T. Roberts, Nov. 2: In the past mo we have amalgamated with four mills 48 tons of ore, from which we obta 6023 grammes of amalgam; the same retorted and melted produced 1507 gra of gold, equal to 48 ozs. 9 dwts. 10 grs. This gold we handed to-day to Mr. for delivery to Mr. Franzi. The stopes in back of the 20, on No. 1 lode, are looking well. The stopes in back of the 10, on No. 2 lode, yield 1 ton of or fathom. The stopes in back of the 20, on this lode, yield 2 tons of ore per The stone-breaker and mills are in good working condition.

PESTARENA UNITED.—A. Dean: I am in receipt of your teleg of 2nd inst.—*i.e.*, forwarding 800*l.* out of October gold. My letter of yester and Mr. Franzi's telegram will have informed you that the money wi sent. It will probably be the 9th before the remittance reaches you. P to give us more time on this side; it was quite by accident that we were en to comply with your wishes. Mr. Franzi returned from Turin as I drove Pallanza yesterday, or the remittance could not have been made in time. post and telegraph cannot be relied upon since the blockade of Paris. I Mr. Franzi's two drafts, 400*l.* each, at 14 days, will be duly protected. He them without acceptance from my representation to him. I think we sha able to provide for the four drafts of 250*l.* each and one for 300*l.* falling d 1st December, by selling new drafts upon the company at three months poss am not at present sure. I meet Mr. Franzi on Saturday to ascertain. that accomplished we shall have pretty well arranged all our financial a to the end of November and beginning of December, and if you collect proportion of outstanding calls we shall be able to do pretty well until th of the year. We shall not produce so much gold in November as in Oct because we have reduced our hands. The costs for November will also be siderably reduced, but we have to pay the heavy costs in September o November gold. I trust that the war will be ended by Christmas, not standing Mr. Russell's predictions to the contrary. The rumour to which refer respecting the wire tramway is exaggerated. The new arrangements not yet been tried other than experimentally, but I am well satisfied that will be made to work well. I have nothing new to report.

CAPE (Copper).—Capt. Rodda, Sept. 15: Spec take 1: I beg to h you a report of the operations done in this mine during the past month. incline has been sunk 1 fm. 5 ft. through ore ground producing 3 tons of c ore per cubic fathom; sinking at 35*l.* per fathom. A stope in the bott the 27 east, 8 cubic fathoms, at 6*l.* per fathom; this work has been carrie by three men and fifteen labourers. The 36 has been driven during the month 1 fm. 3 ft. 9 in., at 20*l.* per fathom, by two men and six labourer winze in the bottom of the 36 has been sunk 1 ft. 4 in., at 20*l.* per fatho the same party. These two bargains are suspended for the present, and the are put to stope in the bottom of the 36 fm. level. The 27 south, on the flo course, has been driven during the past month 2 fms. 4 ft., at 6*l.* per fatho one man and one labourer; this end will yield ⅛ ton of copper ore per fat The level east of flookan course has been driven during the past month 10 in., by one man and one labourer, at 6*l.* per fathom; this end will also ¼ ton of good copper ore per fathom, but I hope very soon it will produce more. The two stopes in the bottom of Arend's pitch have been work three men and 22 labourers 33 cubic fathoms, at 4*l.* per fathom; these will yield about 3 tons of copper ore per fathom. The stope in the bott the 27 has been worked by one man and ten labourers 6 cubic fathoms, at 11 cubic fathom, and will yield 2 tons of copper ore per fathom. The stope i back of the 27, east of Thomas's pitch, is worked by two men and ten labou 11 cubic fathoms, at 7*l.* per fathom, and is worth from 2 to 3 tons of copper per fathom. The level driving west, also by the same party, 1 fm. 4 in., at 6 fathom, yielding 1⅛ ton of copper ore per fathom. August extract of co 110 tons, averaging 32½ per cent. I am pleased to say that our new pump be at work about the 17th inst., which I trust will be a great advantage to dressing operations.

Ookiep.—John Williams, Sept. 22: I beg to hand you the following repor the various operations carried on in the trial mines during the past mont Koperberg: The adit level, east from Jones's shaft, has been extended du the past month 5 fms. 5 ft. 8 in., through ground that has yielded from 1 to 2 of copper ore per fathom; the end at present is very kindly, and will yield a 1⅛ ton of ore per fathom. The extent of ore ground opened in this level is a 30 fms. in length, which will yield from 1⅛ to 2 tons per fathom; re-set, Sep to one man and seven labourers, at 13*l.* per fathom, for 5 fms., or the mo Carson's shaft has been sunk during the past month 4 fms. 3 ft. 10 in., w has yielded some good saving work, and is looking very promising for fur improvement; the shaft is now 10 fms. 2 ft. 2 in. below the surface. We within a month from this date to have the shaft communicated with the level, which will give us good ventilation for driving east, and sinking the below the level; re-set to two men and seven labourers, at 15*l.* per fathom, 4 fms., or the month.—Springbok: The shaft sin[illegible] below the adit, on the mineral course, has been sunk during the month 1¼ fm., which yielded a 1¼ ton of copper ore per fathom; at present it is poor, but looking very kin to make again; the shaft is 9 fms. below the level; re-set, Sept. 6, to one and four labourers, at 26*l.* per fathom, for 2 fms., or the month.—Nahabe The 17 fm. level, driving north from Price's shaft, has been extended during past month 3 fms. 1 ft. 7 in., which has produced some good stones of ore, not in sufficient quantity to value at present; the end is very kindly; re- Sept. 7, to two men and six labourers, at 20*l.* per fm., for 3 fms., or the mont

Letter from tramway engineer, to Sept. 7, reports the line completed to 35th mile, and road formed to the 40th mile.

[For remainder of Foreign Mines see to-day's Journal.]

MINING IN NEVADA.—As instances of marked success in rec mining and milling operations a few only can be cited. Omitting the w known and oft-quoted cases occurring on the Comstock lode and several of California quartz mines, some of which show a larger gross product than e before, we find the earnings of the Stanford Mill, in the White Pine distr running upon ore from the South Aurora Mine alone, having averaged the summer about $60,000 per month—a sum that might be doubled, and even qu rupled, with an equivalent increase of mill-power, so enormous are the reser In this mine; and it is really the case that the claims being opened in this cinity are, as a general rule, likely to pass the ordeal of deep exploration in most triumphant manner. There has at no time been any question as to richness of the surface deposits at White Pine, though, owing to certain ec tricities that characterised them, there was some uneasiness felt at first in gard to the probabilities of their continuity at greater depths. This prob has been pretty satisfactorily settled by the exploratory work already pr cuted on the South Aurora, Hidden Treasure, Eberhardt, Consolidated Aur and other leading mines on Treasure Hill, all of which exhibit conclusive dence of permanency, and some of them also of enormous wealth in their lo levels. Never did the South Aurora present such an encouraging aspect a the present, a heavy body of ore—much of it assaying over $1000 to the t having been uncovered to a depth of more than 100 ft. in what is known as Autumn shaft. This ore is so valuable that it is sacked up before being moved from the mine. The Sanford mill is now running with great succ not only turning out large amounts of bullion, but working the ore with gre closeness than ever before, late workings showing a loss of but 14½ per cent pulp assays, more than 3000 tons having been milled with this result.

The Eberhardt Mine, lately transferred, together with a cont ling interest in the Consolidated Aurora, to a wealthy English company, s to be renewing its productive energies, much of the ore now being raised f it assaying from $200 to $700 per ton, and there is little doubt but both this the Aurora will soon be yielding their former princely revenues. The large well-appointed mill of the Meadow Valley Company, Ely district, which sta up about the middle of July, has been running without cessation since, results not exactly ascertained, but understood to be extremely large. F Cortez, Twin River, Belmont, Reveille, Kearsage, and Pahranagat, all once faulting districts, such amounts of bullion are now being sent as must soo verse the popular judgment entered against them. At Reno, the Auburn upon which and its accompanying properties an English company sunk half a million of dollars, is now, after standing idle for a number of years, rating with splendid results—its success being due in part to superior man ment, and in part to the employment of the Stetefeldt furnace in roasting ores. To the use of this furnace much of the success achieved by the Manha mill, at Austin, may also be attributed, this invention constituting one of most valuable improvements yet introduced for the treatment of our mor bellious silver ores. With its aid the most troublesome elements can readi disposed of, rendering all but the galena ores, which necessarily require s ing, thoroughly tractable. Through the employment of Paul's electric pro a number of mills throughout the country have also been enabled to ach great gains over former methods of ore treatment, thus promising, as comes more extensively introduced, a resuscitation of operations on many now languishing or abandoned mines.—*San Francisco Commercial Herald.*

Astor House, in Broadway, New York, so well known to many our readers, is to be converted into a grand Central Telegraph Station, will converge the whole telegraph system of America and Europe. It has leased for a term of twenty years, from May 1, 1871, by the Western Union legraph Company, at the annual rent of $60,000, or 12,000*l.* sterling. owners of the building, the heirs of the late J. J. Astor, engage to expend equal to one year's rent upon the alterations required to adapt the buildin ts new purposes.

LONDON GENERAL OMNIBUS COMPANY.—The traffic receipt the week ending November 6 were 9476*l.* 17s. 8d.

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